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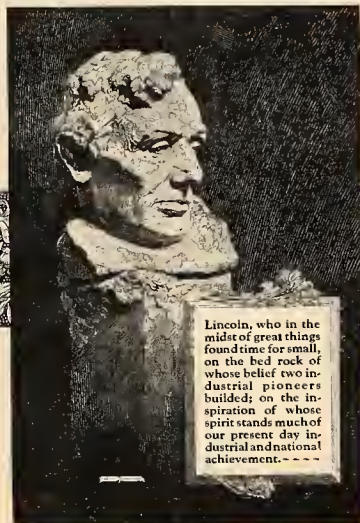
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EXTENDING THE CONTRACTOR'S WORKING DAY BY FLOOD LIGHTING



Lincoln, who in the midst of great things found time for small, on the bed rock of whose belief two industrial pioneers builded; on the inspiration of whose spirit stands much of our present day industrial and national achievement. - - -

Two Men Who Knew Lincoln

"LET'S go out tomorrow and see the thing shoot," said Lincoln. So began Christopher Spencer's career.

The story is told for the first time in this issue of the Scientific American. It is one of the last of the personal testimonies—they grow rarer as the years pass—of the imperishable kindness and the untiring interest in human affairs that were Abraham Lincoln's.

Wrestling as he was night and day with the death struggle of a nation divided against itself, the President yet made time for the young inventor who believed he had found something the nation could use. "Let's see it shoot," said Lincoln. So the vision became actual.

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THERE was another young man who was helped by the President in those same days of national stress. His was the vision of drop

forging pistol parts, to accelerate the supply of much needed weapons for the northern forces. Him, too, the President found time to encourage, and to C. E. Billings the message came:

"Go ahead and drop forge."

Two visions made actual by the man who found time for small things in the midst of great ones.

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GIVEN the oak, it profits us not only to think of the acorn, but also of the sun and the rain and the long days of kindly time—for so we may remember that the oak is the product not of the acorn alone.

Given a great industrial achievement, it profits us to think not only of the acorn of vision in the minds of two men from which it sprang.

Something else was there: the belief of Abraham Lincoln.

VISION and belief! Great enough things to build on, even as the Billings & Spencer Company of Hartford has been built, to endure through the decades, to spread its products all over the civilized world, to hand down from father to son an unchanging ideal of endeavor and achievement.

Tall, gaunt, black-coated: the face deep lined, the eyes keen and far seeing under the bushy eyebrows—

To Spencer he said, "Let's see the thing shoot." To Billings, "Go ahead and drop forge."

B

"GO ahead and drop forge."

The Billings & Spencer Company has obeyed orders.

This advertisement is published by the Billings & Spencer Company, of Hartford, manufacturers of hand tools, drop forgings and machinery. It is designed to supplement the article regarding Mr. Spencer's acquaintance with Lincoln which is published on pages 102 and 103 of this issue.



Abraham Lincoln and the Repeating Rifle

How an Inventor's Struggle for Recognition Was Assisted by the Action of the President

UNDOUBTEDLY one of the secrets of President Lincoln's success in dealing with difficult problems was his sense of proportion. He saw the essentials and took hold upon them with a firm grip. So clear was his vision and so logical his mind that in studying a complicated problem he saw the controlling facts of that problem standing up as sharply and distinctly as the great peaks of the Alps stand out from the foothills below them. Consequently, he obtained results with a minimum of effort and moved to his goal with the directness of a well-shot arrow to the bullseye.

As always happens in such an emergency, Washington, during the War of the Rebellion, was flooded with inventions, and the various departments, the Congress, and even the White House itself, were invaded by a crowd of earnest men, who believed they had devices by the use of which victory for the Union forces could quickly be assured. Among those who went thus to Washington was a certain Christopher N. Spencer, a young machinist from New England. He carried with him a repeating rifle of his own design and bearing his name, which was destined to have a large share in the ultimate success of the Union armies, and was to become famous throughout the world.

The Inventor of the Repeating Rifle

The publishing of the present article about an invention which was fully described in our columns sixty years ago is due to the fact that Mr. Spencer is still dead—very much alive—and that he recently came in person to our editorial offices for a little talk about those early days. He brought with him as his visiting card a photograph of the front page of the *Scientific American* of January 25, 1892, containing drawings and description of his repeating rifle, the first of its kind to be successfully operated. Also, he left with us an extremely interesting photograph of a target made by Mr. Lincoln with one of the new rifles which he had given to the President.

Mr. Spencer carries his eighty-eight years very lightly and finds his recreation in active work. His memory is clear, even to details, and he sketched out the salient features of his life, when these were requested, with a facility which showed how gently the years had touched him.

Sharps' single-shot breech-loader was brought out in 1848, and in 1857 young Spencer, then twenty-four years of age, conceived the idea of building a repeating rifle with the magazine running down through the inside of the stock. He worked over the problem, making experimental guns until, in 1859, he felt justified in applying for a patent. It was granted to him on March 6, 1860. In those days he was working for Cheney Bros., silk manufacturers, of South Manchester, Conn., the place of his birth, and while with them he obtained a patent for an automatic silk-winding machine. This, by the way, has historic interest also, from the fact that it was the machine "with which Pratt and Whitney began manufacturing in their first rented room in Hartford." From his boyhood up Spencer had exercised a strong fascination over Spencer and his spare time was given over entirely to the development of his gun.

Secretary Gideon Welles Helps Him

It seems that Charles Cheney, his employer, was a close friend of the Hon. Gideon Welles, Secretary of the Navy, and he and Spencer took a rifle to the Washington Navy Yard, where it was required to stand a test of firing 1000 rounds without ceasing. In the course of this trial Spencer was officially timed to have fired twenty-one shots in sixty-two seconds. This brought an order from the Navy Department for one thousand guns.

The navy contract had been filled many months before any order could be secured from the War Department. There was something strongly suggestive of times more modern when Mr. Spencer told us that a certain general of that day, "the fossil of the Ordnance Department, would not approve any 'new-fangled fancies'." Recourse was had to the assistance of James G. Blaine, the Speaker of the House of Representatives,

and through his influence and that of President Lincoln a contract was signed by the Assistant Secretary of War, Thomas Scott, for 10,000 of the new weapons. Before the close of the war the Government purchased 200,000, which did great execution at the Battle of Gettysburg and in other important battles of the war.

Mr. Spencer's account of his meeting the President, as related to us by himself is full of interest and is characteristic of the great directness and simplicity of Mr. Lincoln's character. "Among my most pleasing recollections of the war times was a shooting match which I engaged in with President Lincoln. I had been delegated by our company to present the President with one of the rifles, which I did on August 17, 1863. On my arrival at the White House I was ushered immediately into the reception room, with my repeating rifle in my hand, and there I found the President alone. I took the rifle from its cloth case and handed it to him. He examined it carefully and handled it like one familiar with firearms. He requested me to take it apart and show the 'inwardness of the thing.' After carefully examining and approving the gun, he asked me if I had any engagement for the following day, and requested me to come over about 2 o'clock, when, he said, 'we will go out and see the thing shoot.'"

President Lincoln Tries the Repeating Rifle

"The next day we started on time for the shooting place, which was about where stands the Washington Monument. With us was the President's son Robert and an official of the War Department."

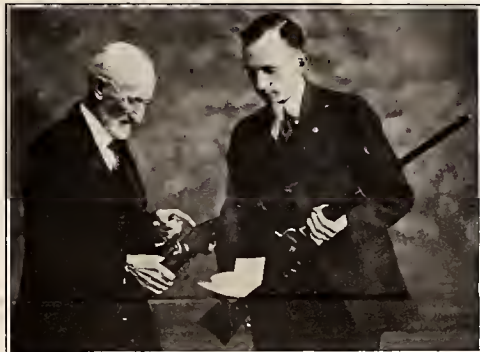
"On the way the President stopped in front of the War Department and sent Robert to ask Mr. Stanton, the Secretary of War, to come with us. While we were waiting Mr. Lincoln told us some good stories and, nothing that one of the pockets of his black alpaca coat was torn, he took a pin from his waistcoat and proceeded to mend it, saying, laughingly, 'It seems to me that this does not look quite right for the chief magistrate of this mighty Republic.' Robert reported that Mr. Stanton was too busy to accompany us. 'Well,' said the President, 'they do pretty much as they have a mind to over there.' The target was a board about 6 inches wide and 3 feet long, with a black spot painted at each end. The rifle contained six 50-caliber, rim-fire, copper cartridges. Mr. Lincoln's first shot was to the left and 3 inches low, but the next shot hit the bullseye and the other five were placed close around it."

"Now," said Mr. Lincoln, "we will see the inventor try it." The board was reversed and I did somewhat better than the President. "Well," he said, "you are younger than I am and have a better eye and steeper nerve!"

The reproduction of this interesting relic is from a photograph of the target which Mr. Spencer left with the editors. The original is among the war relics at Springfield, Illinois.

Invents the Automatic Turret Lathe

After the war Mr. Spencer went to Amherst and was there associated with C. E. Billings, of the Howe Repeating Arms Co., and in 1868 Mr. Billings and he started the Billings and Spencer Co., Mr. Spencer co-operating in the development of the drop-hammer. He is still a director in that company. Somewhat later Mr. Spencer invented a machine for turning sewing-machine spools, and this suggested to him that it might be possible to make metal screws automatically. Out of this effort came that great invention, the automatic turret lathe. Joseph Wickham Roe, of Sheffield Scientific School, Yale University, speaking of the device, says: "The



On left, Mr. Spencer, now 88 years old, with his original repeating rifle of 1860. On right, Mr. Gay Hubbard is holding a Sharps single-shot breech-loader of 1849



Photograph of target made by President Lincoln in 1863, in a friendly contest with the inventor. The second shot, just below the white paint, is a bullseye; the others are bunched closely around it

